To improve the stream ecosystem along this reach on the North Fork Mills River, the Pisgah National Forest proposes

Forestry Best Management Practices related to water quality– NFsNC Monitoring

DRAFT - Best available data as of February 2013. Map may have been developed from different sources, accuracies and modeling, and is subject to change without notice.

BMP Background

Historical Perspective

Small splash dam, seen from below, at the summer camp of the Biltmore Forest School.

Existing Guidance

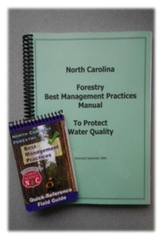
In North Carolina, the performance standards defined by **Forest Practices Guidelines Related to Water Quality (FPGRWQ)** must be met if a forestry operation is to remain ***exempt*** from submitting an erosion and sediment control plan, obtaining permits, and meeting other requirements described under the state's Sedimentation Pollution Control Act of 1973 as amended in 1989.

Nantahala & Pisgah Plan States:

Prevent visible sediment from reaching perennial and intermittent stream channels and perennial waterbodies in accordance with NC Forest Practices Guidelines related to Water Quality (NC FPGRWQ). (*Standard, page III-40*)

BMPs are the vehicle to do this :

"Best Management Practice" (BMP) means a practice, or combination of practices, that is determined to be an effective and practicable (including technological, economic, and institutional considerations) means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals.



Monitoring Results

Nantahala & Pisgah LRMP Monitoring Question:

"Are management practices in compliance with NC FPGRWQ?"

2009-2012 Forestry BMP Monitoring Summary

BMP Category	Implementation %				Effectiveness %					Visible Sediment % [1]		
	Meets or Exceeds	Minor Departure	Major Departure	Gross Departure	Improvement Over Past	Adequate Protection	Minor/Temp. Impact	Major Short-Term Impact	Major Long-Term Impact	No Visible Sediment	Non-Critical Visible	Critical Visible
Harvest Area Including Skid Trails/Log Decks	97.3%	1.9%	0.8%	0.0%	0.0%	97.1%	2.3%	0.6%	0.0%	99.5%	0.5%	0.0%
Skid Trail Stream Crossings	88.7%	8.1%	3.2%	0.0%	6.5%	83.9%	6.5%	3.2%	0.0%	87.5%	12.5%	0.0%
Roads	91.7%	5.8%	1.5%	0.9%	0.9%	93.0%	3.7%	1.5%	0.9%	93.1%	5.5%	1.4%
Road Stream Crossings	88.8%	4.3%	6.2%	0.7%	0.0%	89.5%	3.3%	4.7%	2.5%	91.5%	7.3%	1.1%
Total Percent	94.1%	3.5%	2.1%	0.3%	0.5%	94.1%	3.0%	1.7%	0.7%	95.8%	3.7%	0.6%

Successful Implementation and effectiveness rates for the BMP category *Harvest Area Including Skid Trails/Log Decks* was 97.3 and 97.1 percent, respectively.
This is a very good implementation and effectiveness rate that indicates the application of BMPs is working in this category and sediment or other pollutants are generally not reaching streams.

Skid Trail Stream Crossings was 88.7 and 90.4 percent, respectively. Non-critical visible sediment was delivered to the stream 12.5 percent of the time. Critical visible sediment was never observed coming from skid trails.
Because it is difficult not to contribute some sediment to the stream with skid trail crossings, these practices should be avoided whenever a better alternative exists. In 2011 & 2012, a temporary bridge was observed along with rock and slash to cross fish bearing streams in the Shope Creek and Mulberry-Globe Timber Sales. This was a great crossing that added virtually no sediment to the stream.

Roads was 91.7 and 93.9 percent, respectively. Non-critical visible and critical visible sediment was observed 5.5 and 1.4 percent of the time, respectively.
This was primarily due to legacy system roads located within the MA-18 (Streamside Management Zone). It will be difficult to improve these ratings because of the road system located near streams.

Road Stream Crossings Implementation and effectiveness rates were 88.8 and 89.5 percent, respectively.
These ratings could be improved into the 90 percent or higher range over time by correcting existing stream crossings where the road grade declines over stream channels and correcting fish migration blockages.

Monitoring Results

Nantahala & Pisgah LRMP Monitoring Question:

"Are management practices in compliance with NC FPGRWQ?"

1992-2000 & 2009-2012 BMP Monitoring Results

BMP Monitoring Period	Implementation				Effectiveness					Visible Sediment		
	Meets or Exceeds	Minor Departure	Major Departure	Gross Departure	Improvement Over Past	Adequate Protection	Minor/Temp. Impact	Major Short-Term Impact	Major Long-Term Impact	No Visible Sediment	Non-Critical Visible	Critical Visible
1992-2000 Total	785	310	56	2	5	833	219	83	3	435	84	20
Percent in Class	68.1%	26.9%	4.9%	0.2%	0.4%	72.9%	19.2%	7.3%	0.3%	80.7%	15.6%	3.7%
2009-2012 Total	1360	51	30	5	7	1361	43	25	10	839	5	5
Percent in Class	94.1%	3.5%	2.1%	0.3%	0.5%	94.1%	3.0%	1.7%	0.7%	95.8%	3.7%	0.6%

The difference in BMP implementation, effectiveness, and visible sediment between the first and second decade is substantial.

- There has been a measured improvement in BMP application and a reduction of sediment delivered to streams.
- BMP implementation improved from 68.1 to 94.1 percent while BMP effectiveness improved from 73.3 to 94.6 percent.
- Visible sediment delivery to streams dropped from 19.3 to 4.3 percent of the practices.

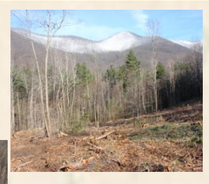
Conclusions

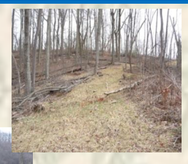
Best Management Practices are being applied and are working properly on the National Forests in North Carolina. There seems to be an improving trend when we consider inspections over the last four years. For example, the overall "no visible sediment to stream channels" rate in 2012 was 99.3 percent., and the highest no visible sediment rate in the last three years was 96.4 percent (2011). Applying the BMP "feedback loop" and working with forest engineers and sale administrators seems to be contributing to better BMP application and water quality.

Additionally, there has been a dramatic improvement in BMP implementation and effectiveness and a decrease in sediment delivery to streams since the last decade of BMP monitoring (1992-2000).

By avoiding skid trail stream crossings when possible (or using temporary bridges), reducing the number of existing road grade sags over streams and correcting fish migration passage problems, BMP implementation and effectiveness should continue to improve.

BMP Photo Gallery





Soil Quality – NFsNC Monitoring

Soil Quality Background

Existing Guidance

National Direction: Per FSH 2509.18 – Soil Management Handbook, Chapter 2, Soil Quality Monitoring national policy is to:

- "Design and implement management practices to maintain or improve the long-term inherent productive capacity of the soil resource.
- Plan and conduct soil quality monitoring to determine if soil management goals, objectives, and standards as outlined in Forest plans are being achieved.
- Use the results of monitoring to evaluate resource management actions and recommend adjustments to practices or mitigation measures to prevent significant impairment of long-term soil productivity."

- Regional Guideline: Do not exceed 15 % detrimental soil disturbance within an activity area.
- LRMP Standard: None.
- LRMP Monitoring Question: Are there significant changes in land productivity?

In 2009 - 2012, Soil Quality Monitoring (SQM) was conducted on the National Forests in North Carolina using the Forest Soil Disturbance Monitoring Protocol (Page-Dumroese, et.al. 2009).

The monitoring was done to determine if there was significant change in land productivity due to timber harvest activities. "Significant change" is defined as detrimental soil disturbance exceeding 15% of each individual harvest unit.

Monitoring Results

Nantahala & Pisgah LRMP Monitoring Question:

"Are there significant changes in land productivity?"

2009-2012 Soil quality Monitoring Summary

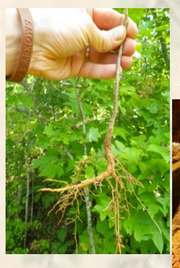
Forest	Timber Sale	Unit #	Pre-harvest (Pre) or Post-harvest (Post)	Unit Area (acres)	Percent Detrimental Soil Disturbance		
					Skid Trails & Landings	Other within Unit	Total
Pisgah	Baldwin Gap	2	Post	11	9.4	0	9.4
		3	Post	27	3.2	0	3.2
		8	Post	23	9.1	0	9.1
Pisgah	Case Camp	3	Post	13	9.2	1.6	10.8
		6	Post	8	2.5	0.1	6.2
		8	Post	12	1.7	3.3	5.0
Pisgah	Shope Creek	23-12A	Pre/Post	12	4.7/9.3	0/2.2	4.7/10.9
		23-13	Pre/Post	9	1.2/2.5	0/0	1.2/2.5
		23-12B	Pre/Post	6	0/5.0	0/0	0/5.0
Pisgah	Mulberry Globe	2	Post	37	0.3	0	0.3
		3	Post	22	12.3	0	12.3
Pisgah	Pressley Fields	1	Post	17	1.0	0	1.0
		2	Post	11	3.5	0	3.5
		3	Post	2	10	0	10
		7	Post	16	8.2	0	8.2
Pisgah	Stateline	1	Post	30	7.0	0	7.0
		2	Post	19	11	0	11

Forest	Timber Sale	Unit #	Pre-harvest (Pre) or Post-harvest (Post)	Unit Area (acres)	Percent Detrimental Soil Disturbance		
					Skid Trails & Landings	Other within Unit	Total
Nantahala	Eagle Fork	1	Post	25	2.4	0	2.4
		2	Post	16	16.3	0	**16.3**
		3	Post	25	9.6	1.4	10.8
Nantahala	Locust Cove	1	Post	10	0.7	0	0.7
		2	Post	18	1.1	3.2	4.4
		3	Post	17	0.5	0	0.5
Nantahala	Slipoff	8	Post	8	4.4	3.1	7.5
		10	Pre/Post	24	0.3/3.6	0/3.3	0.3/7.0
		11	Pre/Post	19	0/6.3	0/0	0/6.3
Nantahala	Farmer Branch	1	Pre	25	0.6	0	0.6
		2	Post	20	3.2	0	3.2
		3	Post	10	6.5	0	6.5
		4	Post	14	15.7	0	**15.7**
		5	Post	18	9.8	0	9.8

Soil Disturbance Corrective Actions

Compaction yielding platy soil structure on skid road in Farmer Branch TS Unit 4.

Skid roads decommissioned to remove detrimental soil impacts in Farmer Branch TS Unit 4, in 2011.



Compaction yielding platy soil structure on skid road in Eagle Fork TS Unit 2.

Skid roads decommissioned to remove detrimental soil impacts in Eagle Fork TS Unit 2, in 2012.

Conclusions

The Nantahala and Pisgah National Forests have met the soil quality performance standard/guideline in 94% of the Post-harvest units surveyed between 2009 and 2012.

Corrective action has the Forest into 100% compliance with the 15% guideline in these surveyed harvest units.

Therefore, our management is not having significant changes in land productivity relative to soil quality.